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Megacolon secondary to autonomic ganglioneuritis in a dog

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MEGACOLON may cause severe constipation leading to intestinal pseudo-obstruction, in which signs of intestinal obstruction are seen without a mechanical blockage. Aetiologies of megacolon are divided into those that cause chronic obstruction of the colon and those that affect neuromuscular function. Many cases of megacolon remain idiopathic (Washabau and Holt 1999). Enteric autonomic ganglioneuritis has been infrequently described in veterinary medicine, causing gastrointestinal signs such as diarrhoea, dysphagia and regurgitation (Baker and others 1985, Willard and others 1988, Joyner and others 1989, Burns and others 1990). In human beings, inflammation of the enteric nervous system has been recognised as a cause of megacolon (Horoupian and Kim 1982, Krishnamurthy and Schuffler 1987). This short communication describes a dog with colonic pseudo-obstruction secondary to idiopathic autonomic ganglioneuritis.

A four-year-old, 20 kg, entire female labrador retriever was referred with a six-week history of constipation and tenesmus. Twice during this period, it had been hospitalised by the referring veterinarian for intravenous fluid therapy and multiple enemas. Radiographs taken after the enemas showed persistence of some faeces in the colon. Lactulose at increasing dosages up to 20 ml orally, three times a day, and cisapride (Prepulsid; Janssen-Cilag) at 10 mg orally, twice a day, had been prescribed with little improvement. The dog's appetite had initially been fair, but it had become anorexic before the two previous hospitalisations and during the week before referral. Occasional vomiting had also been noted. Previous history included generalised seizures, which had started nine months before referral and were being controlled with phenobarbitone (Epiphen; Vetoquinol) at 45 mg orally, twice a day.

On physical examination, the dog exhibited a moderate amount of generalised muscle wasting. The abdomen was distended and appeared to be uncomfortable when palpated. Rectal examination revealed no abnormalities except for a large amount of dry, firm faeces. A neurological examination was normal except for generalised muscle weakness. No evidence of dysautonomia, such as decreased tear or saliva production, mydriasis, nasal or ocular discharge, or bradycardia, was observed.

The results of a haematology screen were normal. Abnormalities on a biochemical profile included hypoproteinaemia (46·7 g/litre, reference range 55 to 73 g/litre), hypoalbuminaemia (19·4 g/litre, reference range 25 to 39 g/litre), hypocalcaemia (1·56 mmol/litre, reference range 2·2 to 2·85 mmol/litre) and increased alkaline phosphatase (517 U/litre, reference range 30 to 250 U/litre). The ionised calcium was normal at 1·09 mmol/litre (reference range 1 to 1·5 mmol/litre). A urinalysis showed concentrated urine (specific gravity 1·031) and negative dipstick and sediment. A thyroid stimulating hormone (TSH) stimulation test was performed using 0·1 U/kg of bovine thyroid stimulating hormone (Thyrotropin; Sigma Chemical). Baseline T4 was 0·00 mmol/litre (reference range 13 to 52 mmol/litre) and the T4 six hours after TSH was 16 nmol/litre (reference range 26 to 100 nmol/litre).

There were no significant findings on thoracic radiography. Abdominal radiography showed the entire colon distended with faeces. Abdominal ultrasonography was normal except for a large amount of gas and ingesta within the intestines.

Initial therapy consisted of warm water enemas, continued lactulose and cisapride therapy, and manual removal of some faecal balls. Two days after admission, the dog became very depressed and had a greatly distended, painful abdomen. Abdominal radiographs showed a small intestinal obstructive pattern secondary to faecal impaction (Fig 1). An exploratory laparotomy was performed.

At surgery, no abnormalities were detected other than a faeces-filled colon and ileum and a gas-distended jejunum. Performing a subtotal colectomy was considered. Since the outcome in dogs for this procedure is not as well elucidated as that in cats (Bright and others 1986), and medical management had not been attempted with the colon free of faeces, it was decided to only remove the impaction and biopsy the intestines. An incision was made in the descending colon, and the faeces were removed. Biopsies of the duodenum, jejunum, ileum and descending colon were taken. The dog recovered from surgery without incident.

Histopathology of the duodenum was normal. Within the jejunum there was a mild increase in the number of eosinophils within the deeper region of the lamina propria. All other tissues, including the autonomic ganglia, appeared normal. The ileum also had a moderate increase in the number of eosinophils within the deeper regions of the lamina propria. A single crypt microabscess and a mild focal submucosal aggregate of neutrophils were seen. The muscularis and serosa were normal. Changes within the colon included mild diffuse mucosal oedema and mild congestion without colitis. The autonomic ganglia within the submucosa of the colon contained a moderate infiltrate of lymphocytes and plasma cells, consistent with autonomic ganglioneuritis (Fig 2). The muscularis was normal.

Food was withheld from the dog for two days after surgery. On the second morning, the dog developed hypoglycaemia, which responded to intravenous dextrose and oral feeding. The dog was discharged five days after surgery with L-thyroxine (Soloxine; Daniels Pharmaceuticals) at 0·4 mg orally, twice a day, cisapride at 10 mg orally, three times a day, and lactulose at 10 ml orally, three times a day.

During the next three weeks, the dog had only intermittent bowel movements, so enemas were given every two to three days. At this time, therapy with prednisolone at 7·5 mg orally, twice a day, was started. For the next six weeks, normal stools were passed, although an enema was occasionally required.

Two-and-a-half-months after referral, the dog was presented to the referring veterinarian after a sudden onset of abdominal pain and profuse vomiting. Bowel movements for the previous week had been small, and no stools had been produced for three days. A large amount of faeces were palpable on abdominal palpation. Performing a colectomy was discussed, but the owner elected to have the dog euthanased. No postmortem examination was performed.

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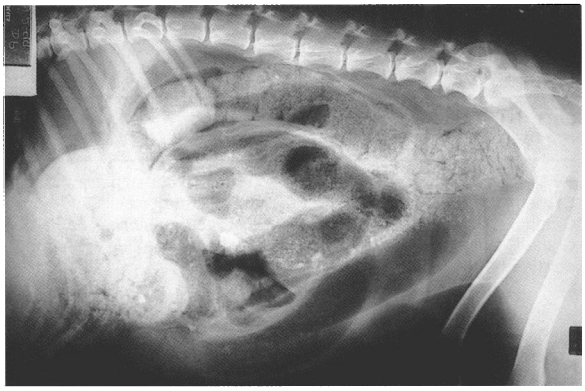

FIG 1: Lateral abdominal radiograph showing a small intestinal obstructive pattern secondary to faecal impaction of the colon

Enteric ganglioneuritis has been rarely reported in veterinary medicine. Previous reports have included a two-year-old Border terrier with idiopathic enteric ganglionitis, which exhibited chronic diarrhoea, dysphagia, oesophageal hypomotility, and extremely rapid intestinal transit time (Willard and others 1988). Decreased intestinal motility leading to pseudo-obstruction has been reported in a cow (Baker and others 1985) and a horse (Burns and others 1990). Myenteric ganglionitis and encephalomyelitis were seen in a psittacine bird with proventricular dilation and regurgitation (Joyner and others 1989). The case described here appears to be the first report of megacolon secondary to autonomic ganglioneuritis in a dog.

Megacolon is characterised by an enlarged, hypomotile colon. Both the radiographic and intraoperative findings support the presence of megacolon in this dog. Hypertrophic megacolon may develop secondary to chronic colonic obstruction, for example, malunion of pelvic fractures, foreign bodies or rectal masses. Dilated megacolon, as seen in this dog, occurs secondary to neuromuscular dysfunction, and has been seen secondary to spinal cord disease or pelvic nerve injury, dysautonomia, and smooth muscle dysfunction. Megacolon is uncommonly seen in dogs, and most cases of megacolon in cats are idiopathic (Washabau and Holt 1999). In addition, megacolon has also been seen in human beings, secondary to congenital ganglionosis, toxin or drug-induced visceral neuropathy, and autonomic ganglioneuritis (Krishnamurthy and Schuffler 1987).

Autonomic ganglioneuritis in people may occur in association with neoplasia, especially small cell carcinoma of the lung (Schuffler and others 1983), Chagas' disease (Earlam 1972), and cytomegalovirus infection (Krishnamurthy and Schuffler 1987). Idiopathic autonomic ganglioneuritis has also been seen (Horoupian and Kim 1982). In the dog reported here, no evidence of neoplasia or infectious disease was found that might have caused autonomic dysfunction. Dysautonomia was considered unlikely because of the lack of characteristic clinical signs. Furthermore, the changes in the autonomic ganglia typically seen with that condition are generally degenerative rather than inflammatory (Oliver and others 1997). It was therefore concluded that decreased intestinal motility was secondary to idiopathic autonomic ganglioneuritis along with potential hypothyroidism.

Hypothyroidism may cause chronic constipation by altering electrical control activity and smooth muscle contractile response in the gastrointestinal tract (Feldman and Nelson 1996). Whether this dog actually was hypothyroid is uncertain because of ambiguous test results. The dog's failure to stimulate in response to TSH into the reference range does suggest hypothyroidism; however, most hypothyroid dogs are not able to stimulate into the normal resting range (Feldman and Nelson 1996), as this dog did. The dog may have had early hypothyroidism or euthyroid sick syndrome. It was decided to treat with supplemental L-thyroxine as a therapeutic trial. There was an apparent response to treatment with bowel movements produced daily or every other day for six weeks. Whether this response was from L-thyroxine, corticosteroids, or cisapride is uncertain. In the end, the dog again became obstipated, possibly because of continuing destruction of autonomic ganglia.

In conclusion, megacolon and intestinal pseudo-obstruction were seen in this dog with enteric nervous system dysfunction associated with an idiopathic ganglioneuritis. Because full thickness intestinal biopsies are required for this diagnosis, Summers and others (1995) suggested that the incidence of pseudo-obstruction in domestic animals secondary to degeneration or inflammation of enteric neurons is potentially much greater than currently thought.

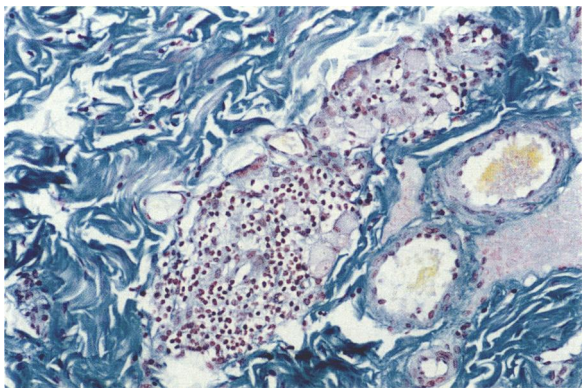

FIG 2: Colonic submucosal ganglion with a moderate infiltrate of lymphocytes and occasional plasma cells; the neurons appear normal. Masson's trichrome. x 20

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